What is claimed is:

[0079] 1. A scanner for reading computer-readable codes, the scanner comprising:

an imaging camera configured to produce an image of a computer-readable code from a surface;

a shroud at least partially surrounding the imaging camera and configured to exclude ambient light from entering the imaging camera when the scanner is held against the surface; and

an illumination lamp disposed within the shroud to illuminate the computer-readable code at an angle such that light from the illumination lamp is not directly reflected from the surface to the imaging camera.

[0080] 2. The scanner of claim 1 wherein the imaging camera has a spectral response variation of less than 25% from about 400 nm to about 700 nm.

[0081] 3. The scanner of claim 1 wherein the imaging camera is a photopic imaging camera.

[0082] 4. The scanner of claim 3 further comprising an optical filter disposed between the imaging camera and the surface, the optical filter transmitting relatively more blue and red light than green light to the imaging camera.

[0083] 5. The scanner of claim 1 wherein the shroud is configured to place the scanner at a selected angle relative to the surface when the scanner is held against the surface.

[0084] 6. The scanner of claim 1 wherein the imaging camera is disposed a distance *d* from the surface and has a camera imaging area with an image width of 2*s*, the imaging area having a first edge and an opposite edge, wherein the illumination lamp is disposed beyond, relative to the imaging camera, a limit line extending from the first edge or the opposite edge at an angle from normal to the surface, the angle being greater than the inverse tangent of *s*/2*d*.

[0085] 7. The scanner of claim 6 wherein the angle is greater than 13

2 degrees.

[0086] 8. The scanner of claim 1 further comprising a photodiode.

[0087] 9. A scanner for reading computer-readable codes, the scanner comprising:

an imaging camera configured to produce an image of a computer-readable code from a surface;

a shroud at least partially surrounding the imaging camera and configured to exclude ambient light from entering the imaging camera when the scanner is held against the surface and to hold the imaging camera in a selected relation to the surface;

a photodiode disposed within the shroud; and

an illumination lamp disposed within the shroud beyond, relative to the imaging camera, a limit line extending from an edge of a imaging region at an angle of inverse tangent $s/2d$ wherein s is one-half the width of the imaging region and d is the distance of the camera from the surface..

[0088] 10. A method of scanning an image of computer-readable code from an electronic display, the method comprising:

providing a scanner with a photodetector and an illumination lamp in the off condition, then;

measuring light from the electronic display with the photodetector, and, if the measured light is below a selected threshold;

turning on the illumination lamp; and

scanning the image of the computer-readable code from the electronic display.

[0089] 11. The method of claim 10 wherein the photodetector is a photodiode.

[0090] 12. The method of claim 10 wherein the photodetector is an imaging camera.

[0091] 13. The method of claim 10 wherein the electronic display is an emissive display.

[0092] 14. The method of claim 10 further comprising steps, after the scanning step, of:

evaluating an exposure level of the computer-readable code, and, if the exposure level is outside preselected limits;

adjusting an exposure parameter of the scanner; and

scanning the image of the computer-readable code from the electronic display.

[0093] 15. A computer-readable medium having computer-executable instructions for performing a method comprising:

measuring light from an electronic display with a photodetector, and, if the measured light is below a selected threshold;

turning on an illumination lamp; and

scanning a computer-readable code from the electronic display.

[0094] 16. A method of scanning a barcode from an electronic display with an imaging scanner, the method comprising:

measuring a refresh period of the electronic display;

setting an exposure time of the imaging scanner according to the measured refresh period.

[0095] 17. The method of claim 16 wherein the exposure time is at least twice the refresh period.

[0096] 18. The method of claim 16 wherein the exposure time is at least ten times the refresh period.

[0097] 19. The method of claim 16 wherein the exposure time is between 10-20 times the refresh period.

[0098] 20. The method of claim 16 further comprising steps of

capturing an image from the electronic display with the imaging scanner;

evaluating the image for an exposure level; and

adjusting an exposure parameter of the imaging scanner according to the exposure level.

[0099] 21. A method of scanning a barcode from an electronic display with an imaging scanner, the method comprising:

capturing a first image of the barcode;

evaluating the first image for an exposure level;

adjusting an exposure parameter of the imaging scanner according to the exposure level;

capturing a second image of the barcode;

attempting to decode the second image to obtain barcode information, and if the attempting step fails;

measuring a refresh period of the electronic display;

setting an exposure time of the imaging scanner according to the measured refresh period;

capturing a third image of the barcode; and

decoding the third image to obtain barcode information.

[00100] 22. A computer-readable medium having computer-executable instructions for performing a method of:

measuring a refresh period of an emissive electronic display;

setting an exposure time of an imaging scanner according to the measured refresh period; and

imaging a barcode displayed on the emissive electronic display.

[00101] 23. A method of scanning an image of a barcode displayed on an electronic display with non-square pixels, the method comprising:

capturing the image of the barcode displayed on the electronic display;

digitizing the image to create a digitized image;

providing the digitized image to a processor;

determining an aspect ratio of a barcode element, and, if the aspect ratio is outside of preselected limits;

scaling the digitized image to create a scaled virtual image with scaled barcode elements having aspect ratios within the preselected limits; and

decoding the scaled virtual image to obtain barcode information.

[00102] 24. A method of scanning an image of a barcode displayed on an electronic display, the method comprising:

capturing the image of the barcode displayed on the electronic display;

digitizing the image to create a digitized image;

providing the digitized image to a processor;

digitally filtering interference patterns from the digitized image to create a filtered image; and

decoding the filtered image to obtain barcode information.

[00103] 25. The method of claim 24 wherein the electronic display is a color display.

[00104] 26. A method of scanning an image of a barcode displayed on an electronic display, the method comprising:

evaluating the electronic display to determine if the electronic display is an emissive display;

capturing a first image of the barcode with an imaging scanner;

evaluating an exposure level to determine if the exposure level is within preselected exposure level limits, and, if the exposure level is not within the preselected exposure level limits;

adjusting an exposure parameter of the imaging scanner;

capturing a second image of the barcode with the imaging scanner; and

decoding the second image of the barcode to obtain barcode information.

[00105] 27. A method of scanning an image of a barcode displayed on an electronic display, the method comprising:

evaluating the electronic display to determine if the electronic display is an emissive display;

capturing a first image of the barcode with an imaging scanner;

evaluating an exposure level to determine if the exposure level is within preselected exposure level limits, and, if the exposure level is not within the preselected exposure level limits;

adjusting an exposure parameter of the imaging scanner;

capturing a second image of the barcode with the imaging scanner;

attempting to decode the second image to obtain barcode information, and, if the attempt to decode fails;

measuring the electronic display for flickering;

determining a flicker period;

setting an exposure time according to the flicker period;

capturing a third image of the barcode with the imaging scanner; and

decoding the third image to obtain barcode information.

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